

## **AE0505D18**

### **SPECIFICATION SHEET**

# **CAUTION:**

**POLARITY MATTERS! RED LEAD ATTACHES TO +V,  
BLACK LEAD ATTACHES TO GROUND (GND)!**

The AE0505D18 piezoelectric stack, sold by Thorlabs, is manufactured by Tokin Corporation of Japan. These stacks consist of many piezoelectric ceramic layers that are assembled in series mechanically and in parallel electrically. To operate, connect the red lead of the device to the positive (+) terminal of the voltage source; do not reverse bias.

#### **I. SPECIFICATIONS**

Displacement at Maximum Drive Voltage:	15um $\pm$ 1.5
Maximum Drive Voltage (short term):	100 volts, (apply positive voltage to red lead, reverse bias will destroy this device)
Operating Temperature Range:	0°C to + 45°C (Actuator Temp. -20 to +85 °C)
Capacitance:	1600 $\pm$ 320 (nF)
Clamping Force:	853 N
Resonant Frequency:	69 KHz (no mechanical load)
Young's Modulus:	4.4 x 10E10 N/m <sup>2</sup>
Recommended Preload:	<425 N
AC or Pulsed operation causes the device to generate heat	

#### **II. CAUTIONS**

Connect red wires to (+) drive voltage, do not reverse bias.

Use room temperature epoxy adhesive for mechanical assembly of device.

Do not store devices about 100°C.

Do not immerse in liquid.

Do not use the device around combustible gases or liquids.

Store devices in a dry place (less than 40% RH).

Do not clean with organic solvents.

## II. MEAN TIME FAILURE

Under the most severe operating conditions (150VDC, 40°C, 90% Relative Humidity) the mean time failure is 500 hours. When the piezoelectric is operated at the recommended operating conditions (100 VDC, 25°C, 60% RH) the mean time failure is increased to 24,500 hours.

The following formula predicts the mean time to failure in hours for specific operating parameters that are below the maximum allowed.

$$\text{Mean Time To Failure} = 500 \times (150/V)^{3.2} \times (90/RH)^{4.9} \times 1.5^{(40-T)/10}$$

V: drive voltage (VDC)      HR: relative humidity (for 60% HR=60)  
T: Ambient Temperature

## III. CAUTIONS

Connect red wires to (+) drive voltage, do not reverse bias.

Do not exceed 150 volts, it will decrease the life expectancy of the device and in extreme cases mechanical failure will result.

Use room temperature epoxy adhesive for mechanical assembly of device.

Do not store devices about 100°C.

Do not immerse in liquid.

Do not use the device around combustible gases or liquids.

Store devices in a dry place (less than 40% RH).

Do not clean with organic solvents.